



# Standard Specification for Nickel-Chromium-Silicon Alloy (UNS N08330) Billets and Bars<sup>1</sup>

This standard is issued under the fixed designation B512; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers wrought heat-resisting alloy UNS N08330 in the form of billets and bars only for reforging.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to become familiar with all hazards including those identified in the appropriate Material Safety Data Sheet (MSDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[B880 Specification for General Requirements for Chemical Check Analysis Limits for Nickel, Nickel Alloys and Cobalt Alloys](#)

[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)

[E1473 Test Methods for Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys](#)

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *bar, n*—material of round solid section with uniform cross section along its whole length, furnished in straight lengths.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.2 *billet, n*—material of solid section with uniform cross section along its whole length, furnished in straight lengths. The typical section is round-cornered square with dimensions typically in the range 1½ by 1½ in. (38 by 38 mm) to 10 by 10 in. (254 by 254 mm).

## 4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Examples of such requirements include, but are not limited to, the following:

4.1.1 Alloy name or UNS Number.

4.1.2 ASTM designation and year of issue.

4.1.3 Section (round, round-cornered square, etc.).

4.1.4 Dimensions (diameter or thickness, width and length).

4.1.5 Quantity (weight or number of pieces).

4.1.6 *Certification*—State if certification is required (Section 12).

4.1.7 *Samples for Product (Check) Analysis*—State whether samples for product (check) analysis should be furnished.

4.1.8 *Purchaser Inspection*—If a purchaser wishes to witness tests or inspections of material at place of manufacture, the purchase order must so state indicating which test or inspections are to be witnessed.

## 5. Chemical Composition

5.1 The material shall conform to the requirements as to chemical composition specified in [Table 1](#).

5.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the chemistry of [Table 1](#), subject to the tolerances provided in [Specification B880](#).

## 6. Dimensions and Permissible Variations

6.1 Billets and bars shall conform to the shape and dimensions specified by the purchaser with a permissible variation of  $\pm 5\%$ .

6.1.1 Material may be conditioned by chipping or grinding to remove injurious surface defects provided the depth of these conditioned areas does not exceed the negative tolerance.

6.1.2 Dimensions may vary locally beyond these limits by agreement between purchaser and supplier.



TABLE 1 Chemical Requirements

Element	Composition Limits, %
Carbon	0.08 max
Manganese	2.00 max
Phosphorus	0.03 max
Sulfur	0.03 max
Silicon	0.75–1.50
Chromium	17.0–20.0
Nickel	34.0–37.0
Copper	1.00 max
Lead	0.005 max
Tin	0.025 max
Iron	remainder <sup>A</sup>

<sup>A</sup> Element shall be determined arithmetically by difference.

## 7. Workmanship, Finish, and Appearance

7.1 The material shall be uniform in quality, commercially straight, and free of injurious imperfections.

## 8. Sampling

8.1 *Lot Definition*—A lot for chemical analysis shall consist of one heat.

8.2 *Test Material Selection*:

8.2.1 *Chemical Analysis*—Representative samples from each lot shall be taken during pouring or subsequent processing. Product (check) analysis shall be wholly the responsibility of the purchaser.

## 9. Number of Tests

9.1 *Chemical Analysis*—One per lot.

## 10. Test Methods

10.1 *Chemical Composition*—In case of dispute, the chemical analysis shall be made in accordance with Test Methods E1473.

10.2 For purposes of determining compliance with the specified limits for requirements of the properties listed in the following table, an observed value, or a calculated value, shall be rounded as indicated below, in accordance with the rounding method of Practice E29:

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Test  
Rounded Unit for Observed or Calculated Value

Chemical composition  
Nearest unit in the last right-hand place of figures of the specified limit. If two choices are possible, as when the digits dropped are exactly a 5 or a 5 followed only by zeros, choose the one ending in an even digit with zero defined as an even digit.

## 11. Inspection

11.1 Inspection of the material shall be as agreed upon between the purchaser and the supplier as part of the purchase contract.

## 12. Rejection and Rehearing

12.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

## 13. Certification

13.1 When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

## 14. Product Marking

14.1 The following information shall be marked on the material or included on the package, or on a label or tag attached thereto: The name of the material or UNS number, heat number, ASTM B512-XX, the size, gross, and net weight, consignor and consignee address, and contract or order number.

## 15. Keywords

15.1 bar; billet; high-temperature alloy